DESCRIPTIONS OF AUSTRALIAN EOLIDACEA (MOLLUSCA: OPISTHOBRANCHIA)

1. THE GENERA *CATRIONA* AND *HERVIELLA*

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Text figures 1-15

SUMMARY

Catriona catachroma and *Herviella claror* spp. nov. are described from the south-eastern Australian fauna together with a further description of *C. viridiana* Burn (1962). *Catriona*, a genus of the family Cuthonidae, comprises two somewhat differing units, here distinguished as *Catriona* s.s. and *Eurycatriona* subgen. nov. Marcus (1957, 1958, 1960) has described species of *Catriona* with characters which would place some in Cuthoninae and others in Tergipedinae as at present defined, thus necessitating revision of the subfamily classification. The absence (Cuthoninae) or presence (Tergipedinae) of a penial stylet offers a convenient system after re-organization of genera. *Herviella*, a genus of the family Favorinidae, is a new record for the Australian Opisthobranchia.

INTRODUCTION

The Eolidacea are a fairly well known group of opisthobranch molluscs throughout the world seas, but in Australia it is only in recent years that any serious research has been undertaken and the results made available in published form. The writer in three papers (1957, 1961, 1962) has described a number of species from the south-eastern Australian coastline and to these a further two new species, *Catriona catachroma* and *Herviella claror*, are here added. A more detailed description of *Catriona viridiana* Burn (1962) is also given, based on more material than the original unique type.

The material examined for this research has been deposited in either the National Museum of Victoria, Melbourne (N.M.V.), or the Australian Museum, Sydney (A.M.), depending upon the State of origin of the material. All material has been collected by the writer.

The writer wishes to thank in particular the Trustees of the Science and Industry Endowment Fund, C.S.I.R.O. for a grant in aid of research on the Australian opisthobranchs. This paper is part of a comprehensive study of the Opisthobranchia of Australia being undertaken by the writer.

SYSTEMATIC SECTION

ORDER NUDIBRANCHIA
SUBORDER EOLIDACEA
SUPERFAMILY ACLEIOPROCTA
FAMILY CUTHONIDAE

The family Cuthonidae is still unsatisfactorily known with regard to the delimitation of genera. Even the division of the family into two subfamilies (Odhner, 1939: 75) based upon the one or two rows of cerata (Tergipedinae) or three and more (Cuthoninae) in the right liver, is no longer acceptable. For example, the genus *Catriona* which is classified as belonging to the Cuthoninae (Odhner, 1939: 53), also has species with two rows of cerata in the right liver, *C. perca* and *C. susa*, and one row, *C. tina* Marcus (1958: 45; 1960a: 916; 1957: 459). Thus if the number of rows of cerata in the right liver is utilized for subfamily division, *Catriona* will form two genera, one classified among the Cuthoninae, the other among the Tergipedinae. It is therefore very necessary to find some other basis for subfamily division, so that the natural groupings of genera are not lost in artificial classifications.

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Odhner (1939: 69) has already emphasised the importance of the genital organs for the classification of the family Cuthonidae and with the recent additions to our knowledge of Cuthonid genera, one characteristic stands out as suitable for the division of the family into two. This is the absence (Cuthoninae) or presence (Tergipedinae) of a penial stylet in the form of a cuticular hollow spine. A re-arrangement of genera to suit this division results in the Cuthoninae having *Cuthona, Precuthona, Myja, Ennoia, Narraeolida, Cuthonella, Piseinotecus* and *Nurja*. To the Tergipedinae belong *Catriona, Subcuthona, Embletonia, Tenellia* and *Tergipes*. Parallel lines of development of the liver branchings are evident in the reconstituted subfamilies.

Genus *CATRIONA* Winckworth (1941: 148).

As Marcus (1957: 461) points out, species with one row of cerata in the right liver cannot be excluded from *Catriona*, although as envisaged by Odhner (1939: 53) there are at least three rows. However, with the addition of species with one and two rows in the right liver (see Family discussion) plus *C. pupillae* Baba (1961: 122) the genus has been greatly widened, so much so that there is now strong justification for dividing it into two distinctive groups, perhaps worthy of generic rank themselves. A brief analysis of the species attributed to the genus, extracted from Marcus (1958: 49-52), reveals that the majority of species do not agree as closely with the type of the genus, *C. aurantia* (Alder and Hancock, 1842; Odhner, 1939: 70, 74, fig. 41) as perhaps they should. *Catriona* as based on *C. aurantia* should contain species in which (i) the radular teeth are very short, broad, concave anteriorly with a receded cusp and prominent denticles with more than one smaller denticle between; and in the genital organs, (ii) a large broadly oval penial gland, (iii) a short straight penial stylet and (iv) a long slender spermatheca. Added to these but possibly of less importance are the facts that the right liver has a raised pad with the cerata in rows upon it (*C. maua* Marcus, 1960b: 178, fig. 74) and that the denticles of the masticatory border of the jaws are composed of bundles of fine bristles (loc. cit.: 179, fig. 76).

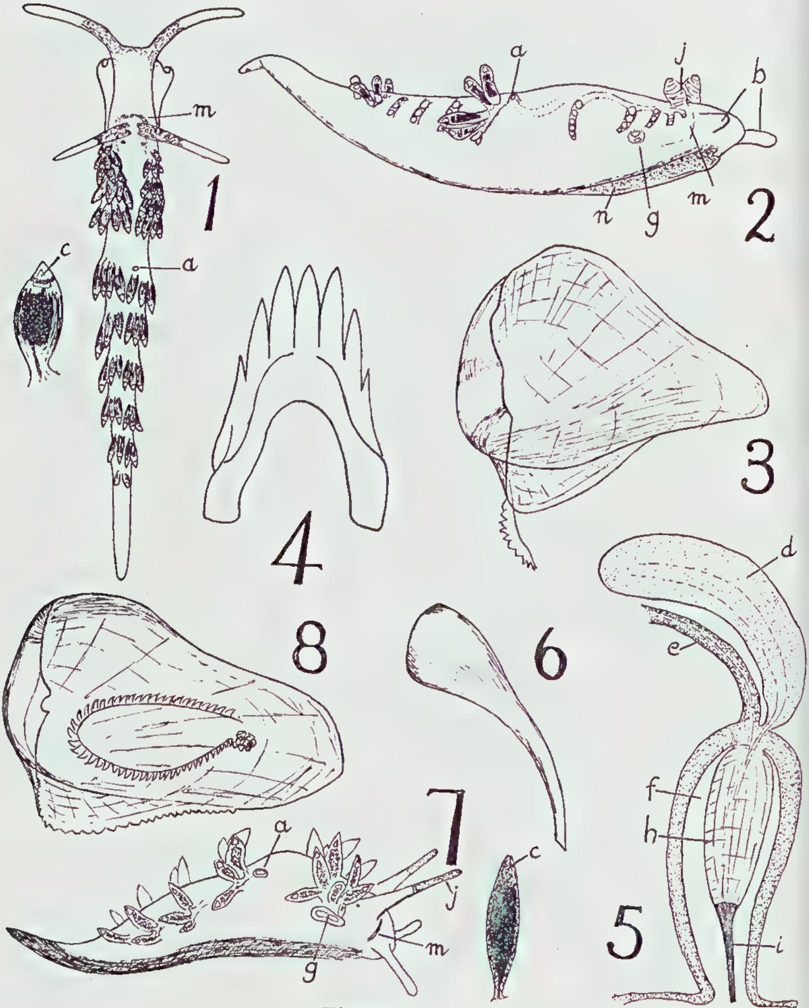
In contrast to these characteristics, the majority of the species have (i) a narrow to broad, anteriorly convex radular tooth with the cusp the same length or very little shorter than the denticles which have not more than one intermediate smaller denticle, (ii) an elongate oval penial gland, (iii) a long curved penial stylet and (iv) a short stalked pyriform or spherical spermatheca. The cerata arise from separate rows in the right liver and the denticles of the masticatory border are coarsely pointed. The species selected as typical of the majority group is *C. viridis* (Forbes, 1840; Odhner, 1939: 72-74, fig. 37-40).

Such is the weight of these differences that I propose to create a new subgenus within *Catriona* for the species grouped around *C. viridis* which becomes the type species. The new subgenus proposed is *Eurycatriona*, the prefix "eury" meaning "wide" to indicate the widespread distribution of species throughout the world seas. A synonym of *Eurycatriona* is *Montagua* Fleming (1822; O'Donoghue, 1929: 743) whose type species, *Doris coerulea* Montagu (1804; O'Donoghue, loc. cit.), can be with certainty assigned to *Catriona* (Marcus, 1955: 173). However, this name is preoccupied by *Montagua* Leach, 1814.

As now understood, *Catriona* and its subgenera may be diagnosed as follows:

Catriona. Acleioproct Eolidacea with a uniseriate radula and a denticulate masticatory border of the jaws; with simple, annulate or perfoliate rhinophores and rounded or angled foot corners; with penial gland and penial stylet; cerata in single rows.

Catriona (*Catriona*). Radular teeth concave anteriorly, cusp receded, denticles prominent with a number of smaller secondary denticles between. Denticles of masticatory border bundles of fine bristles. Penial stylet short, straight. Spermatheca long, slender. Right liver with raised pad bearing 3-4 rows of cerata.



Figures 1 to 8

Catriona (*Eurycatriona*). Radular teeth convex anteriorly, cusp same length or shorter than denticles, at most one smaller secondary denticle between. Denticles of masticatory border coarsely pointed or rounded. Penial stylet long, curved. Spermatheca short, pyriform or spherical. Right liver with one to five rows of cerata.

The two species described below belong to *Eurycatriona*.

Catriona (*Eurycatriona*) *catachroma* sp. nov.

Figures 1-6

Material examined: Point Danger, Torquay, Victoria, 144° 19′ East 38° 20′ South; 2 specimens, 10 December 1961, N.M.V. reg. no. F23,443 (holotype) and F23,444 (paratype).

Habitat: Near to one another on brown algae tips in rock channel at low tide.

Description: Alive both specimens measured about 10 mm. in length. Preserved the larger (holotype) is 5.5 mm. long and with the cerata, 2 mm. high and wide. The sole is medianly folded, 0.3 mm. wide. The cerata are up to 1 mm. in length. The living slugs were palest pink suffused with cream, the upper parts of the rhinophores and tentacles yellow, their bases orange. Cerata transparent, digestive glands dull grey-green, cnidosacs cream; surface everywhere speckled with minute brilliant blue dots, the middle part of the anterior side with a heavy dusting of white, the lot surmounted by a large yellow cap. The eyes are black and the jaws show through the head as a greyish mass (Fig. 1-2, *m*). Preserved, the whole coloration is dull pink.

Head narrow; rhinophores tapering, somewhat wrinkled; tentacles cylindrical, curved laterally. Foot corners rounded, sole wider than head anteriorly, tail very long and narrow, tip rounded, as preserved turned up. Cerata (Fig. 1) short and stout, cnidosacs (*c*) about one-quarter length. The right liver and its left-side counterpart have five simple rows of cerata, from the front containing at most 3, 4, 5, 6, 7 cerata. The posterior liver has five or six rows each side, the first two with 4 cerata, the second two with 3, then a short row of 2 and finally a single ceras.

The genital aperture (Fig. 2, *g*) with contiguous openings lies below and behind the third right row of cerata. The anus (Fig. 1-2, *a*) is dorsal to the first row of the posterior liver on the right side.

The yellowish 0.8 mm. long jaws (Fig. 3), strengthened anteriorly and ventrally, are trigonal like those of *C. foliata* (Forbes and Goodsir, 1839; Odhner, 1939: 75, fig. 43, ii) but more erect anteriorly. The masticatory borders are short and bear 9-10 generally pointed broad denticles. The colourless radula contains 30 teeth (Fig. 5), each with the cusp only as long as the flanking denticles. On each side of the cusp, two large and one small much lower denticles.

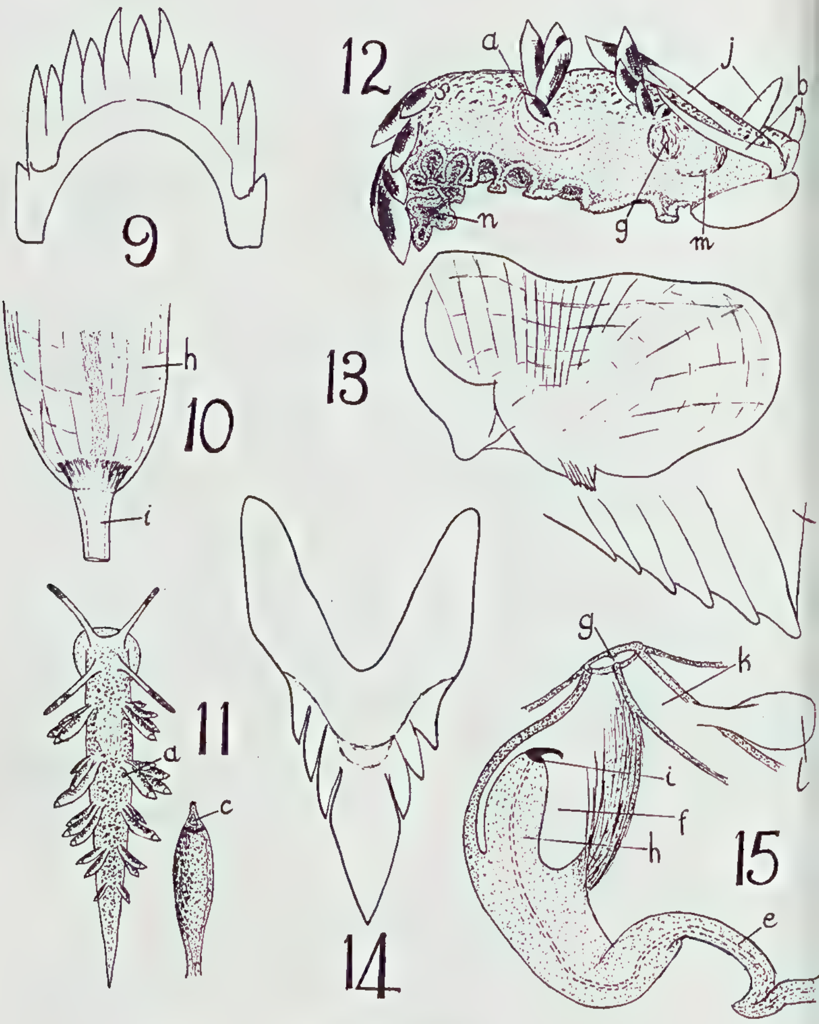
The fusiform penis (Fig. 5, *h*) is tipped by a very long slender curved amber penial stylet, 0.3 mm. long (*i*, Fig. 6). An elongate sausage-like penial gland (*d*) enters the base of the penis beside the male efferent duct (*e*).

Discussion: *C. catachroma* need only be compared with species having four or five rows of cerata in the right liver. Species with four rows are numerous but only one, *C. nigricolora* (Baba, 1955: 29,52, pl. 15, fig. 41, text fig. 46-47) has as few as three denticles each side of the cusp in the radular teeth. *C. nigricolora* is distinguished by a receded cusp on much broader radular teeth, 30 denticles on the jaw masticatory border and the black body and cerata colour.

Species with five rows are not common, the best characterized being the type of *Eurycatriona*, *C. viridis* (Forbes, 1840; Odhner, 1939: 70, 72-74, fig. 37-40) from northern Europe. From the new species, *C.*

viridis differs in the longer jaws and raking masticatory border denticles, the 5-6 denticles each side of the cusp in the radular teeth and the shorter penial stylet. The disposition of the liver rows, genital apertures and anus, together with the numbers of cerata in the rows, is practically identical in *C. catachroma* and *C. viridis*.

The specific name is derived from the Greek kata chroma—signifying "down colour" or "to turn very pale", in apt allusion to the living coloration.



Figures 9 to 15

Catriona (Eurycatriona) viridiana Burn

Figures 7-10

Catriona viridiana Burn, 1962:111-112, fig. 13. Torquay, Victoria.

Material examined: Point Danger, Torquay, Victoria; 1 specimen, 6 September 1959, N.M.V. reg no. F23,445; 2 specimens, 31 December 1959, N.M.V. reg. no. F23,446; 1 specimen, 5 March 1960, N.M.V. reg. no. F23,447; 5 specimens, 12 November 1961, N.M.V. reg. no. F23,448.

Habitat: More often than not the specimens are taken on algal tips in rock pools and channels at low tide level. The holotype was found under a stone (loc. cit.: 112) while another was found on the green alga, *Caulerpa scalpelliformis*, with which its colour blended well.

Description: Living specimens do not exceed 8 mm. in length; preserved the largest specimen is 3.3 mm. long, 1.4 mm. wide and with the cerata, 1.9 mm. high. Sole of foot broad with narrow margins, at widest 1 mm. Cerata up to 0.6 mm. high and 0.4 mm. diameter. Alive, the body-colour is palest greenish-yellow and the digestive glands green brown. In alcohol, the animals are wholly dull orange.

Head narrow; rhinophores (Fig. 7, *j*) proximally adjoining, long and tapering to a fine rounded point; tentacles short, curved forward, wider at ends. Foot as wide as head, corners rounded; tail short, tip rounded. Cerata short fusiform, cnidosacs (*c*) small, about one-fifth of length. Right liver with three simple rows, at most respectively with 3, 4 and 5 cerata; behind are four rows with 5, 4, 4, 3 cerata.

Genital apertures (*g*) contiguous, lateral to second row of right liver. The anus (*a*) is dorsal to the first ceras of the right side posterior liver first row.

The pale horn 0.6 mm. long jaws (Fig. 8), strengthened in front, are elongate pyriform. Masticatory borders with 30-40 rounded denticles of varying sizes, the foremost smallest and pointed. The pale yellow radula has 22 teeth in the straight dorsal limb, 30 in the curved ventral limb and about six more heaped together in an ascus-like bunch as in *Capellinia conicla* Marcus (1958: 43, fig. 76). The teeth (Fig. 9) are broader than long, each with a receded cusp and five alternately large and small denticles each side.

The round-ended penis (Fig. 10, *h*) bears a short straight brown stylet (*i*), the base of which is sunken in the tip of the penis. The stylet appeared to be broken in the specimen examined. An elongate oval penial gland surmounts the penial base, its connection is through a narrow duct.

Discussion: Species with three rows of cerata in the right liver and 4-5 denticles each side of the cusp in the radula form a large section of *Catriona*. The Japanese *C. venusta, C. anulata* and *C. pinnifera* (Baba, 1949: 98-100, 174-175, pl. 41-42), *C. ornata* (Baba, 1937; 1955: 27-28, pl. 14), *C. signifera* and *C. purpureoanulata* Baba (1961: 369-370, pl. 14-15) all have these characteristics in common. All except *C. venusta* are distinguished by having a longer than wide radular tooth, thus not conforming with *C. viridiana*. Together with *C. venusta,* all have different coloration to *C. viridiana*. The South African *C. speciosa* Macnae (1954: 3-6, pl. 1, fig. 1, text fig. 1-3) which is almost identical with *C. venusta* in size, liver branching, radular teeth and coloration, is separated from *C. viridiana* by its coloration and small number of large denticles on the masticatory borders.

SUPERFAMILY CLEIOPROCTA
FAMILY FAVORINIDAE
SUBFAMILY FAVORININAE
Genus *HERVIELLA* Baba (1949: 107, 180)

This genus is restricted to species of Favorinidae with a single oblique row of cerata set in single file (Favorininae) in the right liver. The anus emerges behind the second row on the right side, that is behind the first row of the posterior liver on the right side and being in the cleioproct position (Odhner, 1939: 50). The foot corners are rounded, the jaws have a prominent knob on the anterior edge and a small number of denticles on the masticatory borders, and the radular teeth are prominently cuspidate with 3-5 lateral denticles. The genital organs have a penial stylet in two species at least.

Hitherto two species belonged to the genus, the type *H. yatsui* (Baba, 1930: 121, pl. 4, fig. 4, text fig. 3; 1949: 107-108, 180-181, pl. 47, text fig. 145-146) and *H. affinis* Baba (1960: 303-304, fig. 1). Both from Japan and of similar dimensions, the two species are separated by details of the jaws, radular teeth and colour patterning. In neither species are the genital organs known. In the Australian species described below, which agrees in every respect with the generic requirements of *Herviella,* a strong penial stylet of the shape of that of the Facalaninae *Godiva* Macnae (1954: 23, fig. 16) arms the tip of the penis.

The New Caledonian *Aeolidia exigua* Risbec (1928: 245-246, pl. 10, fig. 8, text fig. 77), later assigned to *Cratena* (Risbec, 1953: 134) has the cerata in single rows along each side of the body, a few large denticles on the masticatory border of the jaws, three denticles each side of a large cusp in the radular teeth, and its coloration is with black body speckling, black ring at mid-length of the rhinophores and sub-apicial orange band on the cerata. Although the position of the anus is not mentioned, this species is almost certainly a *Herviella.* Its penial armature of an amber spine agrees with the species described below and adds weight to this generic assignment.

H. claror spec. nov. is the first Australian record of the genus.

Herviella claror sp. nov.

Figures 11-15

Material examined: Woody Head, north of Clarence River Heads, northern New South Wales, 153° 22′ East, 29° 20′ South; 2 specimens, 5 October 1959, A.M. reg no. C.63,044 (holotype) and C.63,045 (paratype).

Habitat: Under stone at low tide level.

Description: Alive, the specimens reach 10 mm. in length; preserved the larger (holotype) is 4 mm. long, 1.4 mm. wide and 1.2 mm. high, the cerata are 1.1 mm. long and the sole at its widest is 0.6 mm. The living animals are white, evenly speckled with black pigment on the body, rhinophores and tentacles. Yellow tips surmount the rhinophores and tentacles. Cerata with brownish digestive glands, white cnidosacs, black speckling on the anterior sides only and a narrow orange band below the tip. In alcohol, they are black speckled pinkish with dark brown cream-tipped cerata.

Head broad, rhinophores (Fig. 12, *j*) with bases adjoining, long, slender, straight, and tips rounded; tentacles (*b*) shorter, stouter, curved forward. Foot wider than head, corners rounded, sole (*n*) broad with thin margins, tail pointed. Cerata fusiform, not elongate as in *H. affinis* Baba (1960: fig. 1, A), with small cnidosacs drawn to a point on the top side. Right liver with one oblique row of four cerata; the posterior liver has four oblique rows respectively with 4, 3, 2, 1 cerata.

Genital aperture (*g*) lateral to the right liver row. Anus (Fig. 11-12, *a*) close behind the second row of cerata on the right side, near to the dorsal ceras.

The pale horn jaws (Fig. 13) are 0.7 mm. long and 0.4 mm. high, elongate oval but somewhat narrower at the first third, ventrally in front of which is a protruding bosse as in *H. yatsui* and *H. affinis* (Baba, 1949: fig. 146, A; 1960: fig. 1, C) but narrower and more prominent. The masticatory border is short with two smaller anterior and four large posterior raking pointed denticles. The 13 radular teeth have clear denticles and brown bases. Each (Fig. 14) has a very prominent cusp, longer but not as broad as in *H. affinis* (1960: fig. 1, E) and three diminishing denticles each side.

The genital organs were partially cleared in cedar oil (Fig. 15). The male efferent duct (*e*) is rather long and without swelling; it enters the dilated penial sheath about 1 mm. from the common genital aperture (*g*). The fusiform penis (*h*) projects 0.3 mm. into the 0.6 mm. long pyriform atrium (*f*) where it lies near the anterior wall. A dark brown curved stylet, 0.1 mm. long, tips the penis; it faces rearwards. The common genital aperture (*g*) is broadly oval, its bottom and top edge medianly ridged; these internally thicken as they approach one another and join to form a median division at 0.1 mm. The oviduct (*k*) is broad; the spermatheca (*l*) pyriform, its duct short and wide.

Discussion: *H. claror* approaches its congeners particularly in colour patterning. From *H. yatsui* and *H. affinis,* it is distinguished by the elongate oval jaws and shorter cerata. *H. exigua* (Risbec, 1928: 245), the nearest geographically located species to *H. claror,* has differently shaped radular teeth, and a longer penis with a longer narrower stylet (loc. cit.: fig. 77, i-ii, iv).

In life, *H. claror* is a very bright little species and in allusion to this the specific name is the Latin "claror" signifying "brightness".

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EXPLANATION OF FIGURES

Fig. 1-6. *Catriona catachroma* sp. nov.
1. Dorsal view of living slug and side view of a ceras.
2. Preserved specimen from right side.
3. Right jaw from inside.
4. Radular tooth.
5. Distal male genital organs.
6. Penial stylet.

Fig. 7-10. *Catriona viridiana* Burn.
7. Lateral view of living slug and a ceras.
8. Right jaw and radula from inside.
9. Radular tooth.
10. Tip of penis and stylet.

Fig. 11-15. *Herviella claror* sp. nov.
11. Dorsal view of living slug and side view of a ceras.
12. Preserved specimen from right side.
13. Right jaw from inside and masticatory border.
14. Radular tooth.
15. Distal portion of genital organs.

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Abbreviations: *a*—anus; *b*—tentacles; *c*—cnidosac; *d*—penial gland; *e*—male efferent duct; *f*—male atrium; *g*—genital apertures; *h*—penis; *i*—penial stylet; *j*—rhinophores; *k*—female duct (vagina and oviduct); *l*—spermatheca; *m*—jaws shining through body; *n*—sole of foot.